

# NOvA

March 15, 2004

Dr. Michael Witherell  
Director  
Fermilab

Dear Mike,

We are submitting the P-929 "Off-Axis" proposal for consideration at your April 2004 PAC meeting. Our collaboration is now called NOvA, for NuMI Off-Axis v<sub>e</sub> Apppearance Experiment. We request Stage I approval of NOvA at the Aspen PAC meeting.

We hope you will agree that the submitted document is the strong proposal that the laboratory and the collaboration jointly desired. The primary goal of our collaboration continues to be the measurement of  $\nu_\mu$  to  $\nu_e$  oscillations with a sensitivity approximately an order of magnitude greater than that which should be attained by the MINOS experiment in 2010 after 5 years of running. Viewed as the potential to measure a signal at the expected MINOS limit, NOvA would see a signal of 149 events on a background of 38 events, assuming no matter effects and no CP violation effects.

The required  $4 \times 10^{20}$  protons per year are not assured in Fermilab's current accelerator plans. We request that the laboratory undertake a specific study of Main Injector proton intensity and particularly of Main Injector cycle time with a goal of completing the study by the end of 2004. This would be an excellent step towards getting the laboratory and the collaboration on the same page regarding this issue.

Following our meeting with you on February 13, we were distressed to learn that the laboratory could not allocate any more funds toward NOvA R&D beyond the \$ 40 K M&S funds originally in the FY04 Particle Physics Division budget. We also have not yet heard from NSF on possible R&D funds from that direction. We hope for the best from NSF but may have to visit you again to plead for the rock bottom needed support. We have a long program of R&D to accomplish by the end of 2004 if we are to make an intelligent final choice on the detector technology. Some of these items are exceptionally critical: 1) purchase of real PVC extrusions and APDs to check that the light output calculation for our liquid scintillator option is correct, and 2) purchase of electronics and PMTs for our Cosmic Ray Background Test setup in Lab E. In addition, we continue to rely on engineering help from Fermilab for ASIC design and mechanical assembly questions and hope that you will encourage this continued effort support of NOvA. A large body of other R&D will be done by the collaboration via more intensive simulations.

So all we need is approval, protons, and \$ !

Sincerely yours,

Gary Feldman          John Cooper  
(temporary co-spokespersons)

cc: H. Montgomery  
J. Appel